

Phonemic awareness: Yea, nay? (Part 2)



Kerry Hempenstall reviews the research into the relationship between phonemic awareness and early reading and discusses the implications.

This article is the second of a two-part series on phonemic awareness adapted with permission from Dr Kerry Hempenstall's blog post of the same name. The first part was printed in the previous (Autumn 2015) edition of this Bulletin. The original post can be found at <http://www.nifdi.org/news/hempenstall-blog/456-phonemicawareness-yea-nay>

The phonemic awareness concept has had a significant influence on understanding reading and its acquisition. Students with it tend to become better readers than those without it. This feature has led to interest in teaching it prior to reading instruction. However, this focus raises several issues about phonemic awareness that are as yet not fully resolved. There remains the niggling concern that the relationship has not yet been definitively determined as causal.

The arrival of phonemic awareness acted as something of a circuit breaker to the acrimonious battles between Whole Language and phonics approaches. Educators who were unwilling to contemplate phonics teaching saw phonemic awareness as a less rigid, more friendly, literacy option – sort of game-like, without drill or worksheets. Over the past four decades, but particularly in the last 30 years, there has been an increasing acceptance that phonemic awareness plays an important role in beginning reading success, and also in specific reading disability or dyslexia (Hatcher, Hulme, & Ellis, 1994; Melby-Lervåg, Lyster, & Hulme, 2012; National

Reading Panel, 2000; Nelson, Lindstrom, Lindstrom, & Denis, 2012; Share, 1995; Stanovich, 1986).



The interest in phonology is unsurprising when one considers that phonological abilities (of which phonemic awareness is a subset) are recognised as the most powerful predictors of reading success. A number of researchers have noted that the predictive power of measured phonological abilities exceeds that of more general cognitive abilities such as intelligence, vocabulary, and listening comprehension (Adams, 1990; Bradley & Bryant, 1983; Juel, 1988; Wagner & Torgesen, 1987; Yopp, 1988). However, see Blomert and Willems (2010) for a contrary finding. The predictive quality has been reported not only for the English language but also for Swedish, Spanish, French, Italian, and Russian (Adams, 1990) and even Chinese (Perfetti & Zhang, 1995). Indeed, Frost (2005) argued that skilled reading, even in shallow orthographies, requires the use of phonological skills. “The preschool child’s rapid mastery of the spoken language does not automatically confer the awareness of phonemic structure necessary to penetrate the written language code.” (Lieberman, Shankweiler, & Lieberman, 1989; Rayner et al., 2001). But every new learner who would grasp the alphabetic principle must somehow make the discovery that words come apart into phoneme units. “Difficulty in attaining phoneme awareness is arguably the price we pay for having evolved to speak (and understand speech) rather than to write and read” (Shankweiler & Fowler, 2003, p.4)

So, what is phonemic awareness?

Various terms have been employed to describe phonemic awareness, such as phonological awareness, acoustic awareness, phonetic awareness, auditory analysis, sound categorisation, phonemic segmentation, phonological sensitivity, and phonemic analysis. Most authors such as Goswami and Bryant (1990) reserve the term phonemic awareness to imply awareness of individual phonemes; whereas, phonological awareness is considered a more global term that includes the earlier developing aspects, such as rhyme and syllable awareness (Melby-Lervåg, Lyster, & Hulme, 2012).

It has been argued that these skills are hierarchical, and it's true that the correlations with reading increase as the complexity of the tasks increases – from low level skills such as syllable recognition to high level skills such as blending sounds (Manolitsis & Tafa, 2011). It may also be that the sequence is at least partly dependent on the experiences of individual students. The more focussed and structured the experience, the more likely a student will have progressed to higher levels compared with same-age peers (Samuelsson et al., 2008). Additionally, there may be genetic effects that influence the ease with which individual students make phonological progress (Soden-Hensler, Taylor, & Schatschneider, 2012).

Phonemic awareness is clearly more complex than auditory discrimination, which is the ability to perceive, for example, that *cat* and *mat* are different speech productions or words. To be able to describe how they are similar but different, however, implies some level of phonemic awareness. Auditory discrimination entails hearing a difference; whereas, phonemic awareness entails a level of analysis of the constituent sounds. Young children are not normally called upon to consider words at a level other than their meaning, although experience with rhymes may be the first indication for children that they can play with the structure of words.

Word level analysis

Prior to these finer intra-word discriminations, children need to appreciate that spoken sentences (a rather continuous stream of sound without clear pauses) are separable into discrete words (Lieberman & Liberman, 1990). It seems surprising that such

an obvious distinction may elude children; however, Adams (1990) and Blachman (1984) pointed out that word consciousness (the awareness that spoken language is composed of words) should not be assumed even in children with several years schooling. Fortunately, they report evidence that it may be taught easily enough, even at a pre-school level. That school age children can lack such fundamental knowledge may be difficult for adults to accept, but it highlights the need in education to assume little, and assess pre-requisite skills carefully. Their warning also challenged the view, held by some Whole Language advocates (Goodman, 1979, 1986; Smith, 1975, 1992), that speaking and reading involve equivalent “natural” processes for all children. The implications of the Whole Language view are that the same environmental conditions that occur during the development of speech are those best provided for children learning to read. Liberman and Liberman (1990) among others (Gough & Hillinger, 1980; Hirsch, 2001; Liberman, 1997) have provided a forceful rebuttal of this equivalence perspective, and the equivalence view has few supporters today.

Syllable level analysis

Having discovered that sentences are composed of words, the next logical unit of analysis is intra-word, at the syllable level. However, syllables can be represented by any number of letters from one to eight. The word *understand* has three syllables, each of a different number of letters. *Un* has two, *der* has three, and *stand* has five letters. This variability makes the syllable unit of limited value in analysing the reading task (Bradley, 1990), and the catch is that one needs to have awareness at the level of the phoneme in order to determine where best to decide the syllable junctions. So, syllable awareness may have limited value as an early curriculum focus.

Rhyme and Alliteration

A recognition of rhyme may be the entry point for many children to phonemic awareness development (Bryant, 1990). To be aware that words can have a similar end-sound implies a critical step in metalinguistic understanding - that of ignoring the meaning of a word in order to attend to its internal structure. This leads to a new classification system, one in which words can be classified according to end-sound rather than meaning. Bryant (1990) points to the considerable

amount of evidence indicating that children as young as three or four years can make judgments such as when words rhyme, and when they begin with the same sound (alliteration). Other studies, such as by Braze, McRoberts, and McDonough (2011) report rhyme sensitivity prior to age two years.

Bryant argues that sensitivity to rhyme makes both a direct and indirect contribution to reading. Directly, it helps students appreciate that words that share common sounds usually also share common letter sequences. The child's subsequent sensitivity to common letter sequences then makes a significant contribution to reading strategy development. Indirectly, the recognition of rhyme promotes the refining of word analysis from larger intra-word segments (such as rhyme) to analysis at the level of the phoneme (the critical requirement for reading).

Awareness at the level of the phoneme has particular significance for the acquisition of reading

There is some evidence that rhyme contributes to the prediction of subsequent reading problems (Bradley & Bryant, 1983; Bryant et al., 1989; Savage & Frederickson, 2006; Wood, 2000), but others (Castles & Coltheart, 2004; Rathvon, 2004) consider its independent role is minimal, and its apparent significance in some studies is better subsumed under phonological awareness. Additionally, confirmatory studies have been criticised for methodological problems, such as ceiling effects on measures, and also the low reliability of the oddity tests employed. Unsurprisingly, whether an instructional emphasis on rhyme is beneficial has been questioned in several studies (Wood, 2000).

This is not to suggest that rhyming activities are to be avoided, as they are enjoyable literacy activities. Engaging in rhyming activities with stories may have strong motivational influences on children's attitudes to books and reading. The point is that such oral activities cannot be expected to transfer to reading text without the relationship between phonological skills and text reading being made apparent.

Onsets & Rimes

Treiman (1991) has suggested a further level in the development of

phoneme awareness - the intra-syllabic units of onset and rime. The onset of a syllable is its initial consonant(s), and the rime is its vowel and any subsequent consonants in the syllable. Thus, in the syllables sip-slip, the onsets are s and sl, and the common rime is ip. Treiman's research has argued for a stage between syllable awareness and phoneme awareness in which children are much more sensitive to the onset-rime distinction than the phoneme distinction. It was asserted that this research held promise for programs of educational intervention in reading disability because of the greater regularity of onset-rimes over individual letters (Felton, 1993). Thus, rime phonograms such as ing, ight, ain have much more regularity than the letters that form them. Knowing that strain and drain rhyme, may allow for reading main and brain by analogy.

If reading development is not phonologically informed then students may adopt less viable strategies, such as guessing and memorisation of shapes

This apparently generative strategy has led some researchers (Bowey, Cain, & Ryan, 1992; Hulme & Snowling, 1992) to suggest that an emphasis on onset-rime may be an especially valuable approach to teaching students with dyslexia, as they tend to have relatively undeveloped phonological skills. Further, Bowey and Francis (1991) considered onset and rime the most effective focus for phonological activities intended to promote beginning reading and spelling for all children. They noted that since most onsets in English are single consonants, an early emphasis on the intra-syllabic onset/rime distinction in the study of word structure was likely to hasten the development of awareness at the more difficult phoneme level.

Phoneme Awareness

Awareness at the level of the phoneme has particular significance for the acquisition of reading because of its role in the development of the alphabetic principle - that the written word is simply a means of codifying the sound properties of the spoken word. In order to decode the written word, the child needs to appreciate the logic of the writing system and, as a prerequisite, the logic of oral word production.

There are two requirements of beginning reading for which phonemic awareness becomes immediately relevant: phonemic analysis (segmentation) and phonemic synthesis (blending). For most children, the ability to produce the finer discrimination of phonemes begins in about Year 1 of their schooling (Ball, 1993). Individual phonemes are more difficult to specify because their acoustic values vary with the phonemes that precede and follow them in a word (a phenomenon called co-articulation); whereas, syllables have relatively constant values in a word and hence should be more readily recognised. The fact that consonants are "folded" into vowels can be understood by noting the different tongue positions for the beginning /d/ sound when it is followed by /oo/ and by /i/.

In most children the ability to synthesise (blend) sounds into words occurs earlier than analytic (segmentation) skills (Bryen & Gerber, 1987; Caravolas & Bruck, 1993; Solomons, 1992; Torgesen et al., 1992; Yopp, 1992). Thus, it is easier to respond with the word *cat* when presented with the sounds *c - at* or *c-a-t*, than it is to supply *c-a-t* when asked to tell what sounds you hear in *cat*.

As indicated above, deeper levels of awareness (i.e., at the phoneme level) tend to develop during first grade upon exposure to reading instruction. Some have argued then that phonemic awareness may be a consequence of learning to read rather than a causal factor in its development (Morais et al., 1987; Morais, 1991). There is increasing consensus that the data are best explained by considering the relationship between phonemic awareness and reading development as a reciprocal one (Duncan et al., 2013; Stanovich, 1992).

A typical sequence for phoneme awareness?

Thus, there may be a typical developmental sequence of phonological awareness. It begins with awareness of words as a unit of analysis; then proceeds to the awareness that words can share certain ending properties that we call rhyme, to an awareness that words can be decomposed into syllables, then (possibly though not definitely) more finely into sub-syllabic units called onsets and rimes, to beginning, final, and medial properties, and then (and most importantly for reading) into awareness of individual phonemes, the smallest unit of sound

analysis. A further developmental sequence involves the movement from recognition of such properties to a capacity to produce examples of them. Thus, at one level one can nominate which pairs of words rhyme when presented orally; at a higher level one can produce examples. It should be noted that the description of the process as developmental does not imply spontaneous development - for many students it needs to be taught (Lindamood, 1994).

The issue of putting ages to levels is problematic partly because of the great variation in the experience of children. Some children play with word structure for several years before school; some have had no experience. The degree of emphasis placed on phonemic awareness in preschool and school adds additional variation, whilst the quality and explicitness of the instruction also make significant contributions (National Reading Panel, 2000). There appears also to be genetic predisposition toward ease or difficulty of acquisition among children (Olson, Wise, Conners, Rack, & Fulker, 1989; Rack, Hulme, & Snowling, 1993; Soden-Hensler, Taylor, & Schatschneider, 2012).

Thus, these levels may be better considered as markers on the road to skilled reading, rather than as a natural developmental sequence, and as susceptible to environmental manipulation, such as early experiences and instruction. Similarly, the rate with which students progress through the levels may vary, and some levels may even appear to be skipped.

A focus on onset-rime or phonemes?

If the levels represent a typical sequence, then approaches to teaching might benefit from taking it into account. There may be some theoretical justification for an interest in onset-rime, but it requires support from intervention research before becoming a suitable component of the curriculum. So, is an emphasis on teaching students to recognise onset-rime distinctions (rather than at the phoneme level) more productive in initial (and, perhaps, remedial) reading instruction than is teaching directly at the phoneme level? A computer program developed by Wise, Olson and Treiman (1990) focussed on onset-rimes in teaching beginning reading skills to normally-developing readers and children with dyslexia. In this and the Olson and Wise (1992) studies, the authors noted an advantage for the children taught in this manner

over an approach that segmented words after the vowel. The effect however was ephemeral, and least pronounced in the more disabled students. Ehri and Robbins (1992) findings were similar in that the poorer readers did not use sub-syllabic units larger than the grapheme. This led them to suggest that the onset-rime distinction is really the province of the more skilled reader, and hence not a candidate for instruction prior to that at the phoneme level.

A number of researchers now have questioned whether an onset-rime emphasis has any useful role to play in beginning reading instruction. Nation and Hulme (1997) express concern that such tasks are not predictive of reading and spelling success. McMillan (2002) argues that it is alphabet knowledge rather than rhyming ability that underpins any causal link to reading ability. Further, Nation, Allen, and Hulme (2001) have questioned the benefit of emphasising analogy as a worthwhile early strategy for reading unfamiliar words. The intent of analogy reading is to allow children to decode an unfamiliar printed word by observing that its spelling is similar to that of a known word. In their study, however, children were not able to see such orthographic similarities at all, leading to a conclusion that the analogy technique is only able to be employed by those readers who already have attained more advanced phonemic awareness (Wood, 2000).

Thus, the results of research suggest caution regarding calls for introducing an initial emphasis on onset-rime distinctions for beginning readers. It would be judicious to ensure that beginners (and disabled readers) have,

or develop, a grounding in grapheme-phoneme relationships, either before (or simultaneous with), such onset-rime emphasis (Munro, 1995). Wise and Olson (1995) reported a study indicating that adequate phonemic awareness skill was necessary if children were to benefit from onset-rime instruction. When readers with dyslexia were provided with phonemic awareness training through Auditory Discrimination in Depth (Lindamood & Lindamood, 1969) simultaneously with onset-rime computer-based training, reading results were markedly improved by this addition of instruction at the level of the phoneme.

The National Reading Panel Report (2000) indicated that large effect sizes were possible when instruction was directed systematically and explicitly at one or two types of phonemic awareness activities provided to small groups, and involved associating phonemes with letters (such as segmenting and blending). "Research evidence indicates strongest gains in PA skills are observed when no more than one to two PA skills are taught at any one time" (Ehri, Nunes, Willows et al., 2001), emphasising phoneme segmenting and blending sounds in spoken words as key foundation literacy skills. Furthermore, PA training is most effective in facilitating early PA skill and accelerating early word reading, when combined with letter knowledge training (Byrne & Fielding-Barnsley, 1991; Ehri, Nunes, Stahl et al., 2001; Ehri, Nunes, Willows et al. 2001; Hatcher et al., 1994, 2006), and when instruction includes exercises to teach the application of PA in reading (words and connected text) and writing tasks (Cunningham, 1990; Hatcher et al., 1994, 2006).

Nation and Hulme (1997) and Hulme et al. (2002) also argue that it is likely to be more profitable to emphasise phoneme awareness even from the beginning reading stages. As is often the case, when several options are available and the evidence is not adequate to clearly support one or the other, the emphasis is most judiciously placed on the alternative that is most closely related to the reading process. Thus, studies up to this stage have raised more questions than answers about the instructional usefulness of onset-rime as a means of gently approaching the difficult phoneme concept.

And what about the student who is resistant to the activity-based curriculum?

As to who might require more intensive and extended assistance,

Torgesen (1998) recommends an identification procedure involving administration of a test of knowledge of letter names or sounds and a measure of phonemic awareness. Students who do not do well on these tests are likely to struggle with reading unless additional support is provided. The National Reading Panel's view was that this focus was so important that all students should have the opportunity to benefit from phonemic awareness activities in their first year of school. Those studies that provided activities for less than a half hour per day to a total of about 20 hours were likely to be effective and efficient.

Some students may have other phonological problems such as slow naming speed (Al Otaiba & Fuchs, 2002) or issues with phonological memory (Wagner & Torgesen, 1987). "The results of this study suggest, as do those by Kuhn and others (2006), that the critical factor for oral reading development in children with reading disabilities, including those with naming-

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speed deficits, is time-on-text, meaning simply that students from this population must spend significant time engaged in structured, monitored reading in order to develop the necessary automaticity in phonological and word identification sub-processes that are required for proficient reading" (Paige, 2011, p. 307).

The issue of when best to introduce phonemic awareness activities/ instruction has also been investigated. Byrne, Fielding-Barnsley, and Ashley (2000) report that it is not only the attainment of phonemic awareness that is important in learning to read, but also its speed of acquisition. In a longitudinal study, they noted that poor readers in fifth grade were those who, though they eventually achieved reasonable levels of phonemic awareness, were slow to grasp it. These students tended to be those whose initial language and literacy levels were also low at school entry. Perhaps there is a window of opportunity when phonological processes can become a driving force for initial reading development. In the Griffiths and Stuart (2013) study, subsequent reading fluency improvement from phonologically based interventions was



significantly better in younger students than in older students.

So, the indications are for programs to commence on school entry, following screening for pre-existing phonemic awareness and letter sound knowledge. In a Response to Intervention model, Tier 1 instruction would involve a well-designed, systematic and explicit program that integrates blending, segmenting and letter-sounds/letter names. Whether this is presented as whole class or in smaller groupings depends upon the results of the screening. There will be some children who continue to struggle even with this evidence-based regimen, and the need for small group and individual instruction of greater intensity and longer duration is likely (Tier 2 and Tier 3 interventions). If reading development is not phonologically informed then students may adopt less viable strategies, such as guessing and memorisation of shapes. If that occurs, phonemic awareness may subsequently develop, but will not necessarily be employed by the student whose alternative, less effective, strategies have become entrenched. Perhaps this is the reason why it can take four times as much intervention to improve a child's reading skills if help is delayed until the fourth grade than if it is begun in the first year of school (Hall & Moats, 1999).

The role of oral reading fluency in promoting reading comprehension was brought to the attention of many because of its status in the report of the National Reading Panel (2000). Less well known is an increasing interest in promoting fluency across a range of basic skill areas (Binder, Haughton, & Bateman, 2002; Lindsley, 1996). Binder et al. suggest that while mastery is important, real expertise in phonemic awareness skills is not present until students can effortlessly and quickly perform the tasks. Thus, they suggest teachers should aim to have students able to blend sounds to form words at a minimum of 10 per minute, segment words into sounds by moving coloured blocks to indicate the sounds at a rate of at least 40 per minute, and construct new words through substituting one phoneme for another at a minimum rate of 15 per minute. This suggestion certainly offers another dimension for teachers wishing to ensure all their students develop a strong phonological basis for literacy.

Implications

- Assess all students on arrival using a combination of phonemic awareness and letter-sounds/names fluency measures. Assume that those students who struggle with these tasks will require intensive intervention from the beginning.
- Adopt a Response to Intervention model to ensure these students are not left to languish and plan for extended oversight and intervention for this cohort. Maintain a regimen of continuous evaluation.
- Explicitly tie phonemic awareness activities into your initial phonics program. For any students who struggle with blending and segmenting, first increase practice opportunities by increasing allocated time. If this is ineffective, consider introducing simpler phonological activities, such as rhyming and alliteration before returning to blending and segmenting. Teach all relevant skills to fluency.
- Encourage parental participation with regular teacher-parent contact and shared programming to increase engaged literacy time.
- Provide additional training in content and method to those teachers in need. Anticipate initial teacher resistance, but develop an evidence-based culture in the school that values data.
- Expect that it will be a long, but worthwhile endeavour. Bear in mind, too, that phonology ain't everything. Due attention must also be paid to other important aspects of literacy, such as comprehension, reading fluency, and oral language, including vocabulary.

References

Full bibliographic details for all in-text references in this article can be found at Kerry Hempenstall's blog entry of the same name at <http://www.nifdi.org/news/hempenstall-blog/456-phonemicawareness-yea-nay>

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